LARID BREEDING SITES BETWEEN YELLOWKNIFE AND GROS CAP, NORTH ARM OF GREAT SLAVE LAKE, NORTHWEST TERRITORIES, 1987

Jacques Sirois
Gordon B. Cameron
Kevin J. McCormick

TECHNICAL REPORT SERIES No. 89
Western & Northern Region 1989
Canadian Wildlife Service

Environment Canada
Environnement Canada

Canadian Wildlife Service
Service canadien de la faune

Canada

TECHNICAL REPORT SERIES
CANADIAN WILDLIFE SERVICE

This series of reports, established in 1986, contains technical and scientific information from projects of the Canadian Wildlife Service. The reports are intended to make available material that either is of interest to a limited audience or is too extensive to be accommodated in scientific journals or in existing CWS series.

Demand for these Technical Reports is usually confined to specialists in the fields concerned. Consequently, they are produced regionally and in small quantities; they can be obtained only from the address given on the back of the title page. However, they are numbered nationally. The recommended citation appears on the title page.

Technical Reports are available in CWS libraries and are listed with the DOBIS system in major scientific libraries across Canada. They are printed in the official language chosen by the author to meet the language preference of the likely audience. **To determine whether there is significant demand for making the reports available in the second official language, CWS invites users to specify their official language preference. Requests for Technical Reports in the second official language should be sent to the address on the back of the title page.**

SÉRIE DE RAPPORTS TECHNIQUES
DU SERVICE CANADIEN DE LA FAUNE

Cette série de rapports donnant des informations scientifiques et techniques sur les projets du Service canadien de la faune (SCF) a démarré en 1986. L'objet de ces rapports est de promouvoir la diffusion d'études s'adressant à un public restreint ou trop volumineuses pour paraître dans une revue scientifique ou l'une des séries du SCF.

Ordinairement, seuls les spécialistes des sujets traités demandent ces rapports techniques. Ces documents ne sont donc produits qu'à l'échelon régional et en quantités limitées; ils ne peuvent être obtenus qu'à l'adresse figurant au dos de la page titre. Cependant, leur numérotage est effectué à l'échelle nationale. La citation recommandée apparaît à la page titre.

Ces rapports se trouvent dans les bibliothèques du SCF et figurent aussi dans les listes du système de référence DOBIS utilisé dans les principales bibliothèques scientifiques du Canada. Ils sont publiés dans la langue officielle choisie par l'auteur en fonction du public visé. **En vue de déterminer si la demande est suffisamment importante pour produire ces rapports dans la deuxième langue officielle, le SCF invite les usagers à lui indiquer leur langue officielle préférée. Il faut envoyer les demandes de rapports techniques dans la deuxième langue officielle à l'adresse indiquée au verso de la page titre.**

Cover illustration is by R.W. Butler and may not be used for any other purpose without the artist's written permission.

L'illustration de la couverture est une œuvre de R.W. Butler. Elle ne peut dans aucun cas être utilisée sans avoir obtenu préalablement la permission écrite de l'auteur.

LARID BREEDING SITES BETWEEN YELLOWKNIFE AND GROS CAP, NORTH ARM OF GREAT SLAVE LAKE, NORTHWEST TERRITORIES, 1987

Jacques Sirois
Gordon B. Cameron
Kevin J. McCormick

Technical Report Series No. 69
Western and Northern Region 1989
Canadian Wildlife Service

This report may be cited as:

Sirois, J.; Cameron, G.B.; and McCormick K.J. 1989
Larid breeding sites between Yellowknife and Gros Cap,
North Arm of Great Slave Lake, Northwest Territories, 1987.
Technical Report Series No. 69, Canadian Wildlife Service,
Western and Northern Region.

93-00183/

Issued under the authority of the
Minister of Environment
Canadian Wildlife Service

©Minister of Supply and Services Canada 1989
Catalogue No. CW69-5/69E
ISBN 0-662-17029-6
ISSN 0831-6481

Copies may be obtained from:

Canadian Wildlife Service
P.O. Box 637
Yellowknife, NWT
Canada X1A 2N5

This report has been printed on recycled paper.

ABSTRACT

A survey of larid breeding sites between Yellowknife and Gros Cap, on the North Arm of Great Slave Lake, was conducted from 19-22 June, 1987. The objectives of the study were to determine the distribution and abundance of Caspian Terns and other larids, and to evaluate this part of the North Arm as a Key Habitat Site for migratory birds in the Northwest Territories. Ancillary observations on other wildlife were recorded as time permitted.

A total of 796 nesting pairs of larids, at 49 sites, were recorded; many contained more than one breeding species. The number of breeding sites of each species was: Caspian Tern - 13, Arctic Tern - 19, Common Tern - 2, Herring Gull - 33, California Gull - 16, Mew Gull - 13, and Parasitic Jaeger - 4. The minimum number of breeding pairs of each species in this area is: Caspian Tern - 13, Arctic Tern - 152, Common Tern - 7, Herring Gull - 245, California Gull - 334, Mew Gull - 41, and Parasitic Jaeger - 4.

RÉSUMÉ

Les sites de nidification de Laridés ont été inventoriés entre Yellowknife et Gros Cap, dans le bras nord du Grand lac des Esclaves, entre le 19 et 22 juin 1987. Cet inventaire avait pour objectifs de déterminer la distribution et l'abondance des Sternes caspiennes et des autres Laridés, et d' évaluer la possibilité d'ajouter ce secteur du lac à la liste des sites reconnus comme exceptionnels (Key Habitat Sites) pour les oiseaux migrateurs dans les Territoires du Nord-Ouest.

Un total de 796 couples de Laridés et 49 sites de nidification ont été dénombrés et dans plusieurs cas, plus d'une espèce y nichaient. Le nombre de sites de nidification pour chacune des espèces se lit comme suit: Sterne caspienne - 13, Sterne arctique - 19, Sterne commune - 2, Goéland argenté - 33, Goéland de Californie - 16, Goéland cendré - 13, et Labbe parasite - 4. Le nombre minimum de couples nicheurs pour chacune des espèces se lit comme suit: Sterne caspienne - 13, Sterne arctique - 152, Sterne commune - 7, Goéland argenté - 245, Goéland de Californie - 334, Goéland cendré - 41, et Labbe parasite - 4.

ACKNOWLEDGEMENTS

Robert Bromley and Kes Vermeer reviewed the manuscript and provided valuable comments and criticism.

Susan Popowich prepared the figures and arranged for printing the report.

Susan Westover gathered the latest information on the status of the national population of Caspian Terns.

TABLE OF CONTENTS

Page

ABSTRACT.....i

RÉSUMÉ.....i

ACKNOWLEDGEMENTS.....ii

LIST OF FIGURES.....iv

LIST OF TABLES.....v

LIST OF APPENDICES.....v

1.0 INTRODUCTION.....1

1.1 Key Habitat Sites.....1

1.2 Objectives.....1

2.0 STUDY AREA.....2

3.0 METHODS.....4

4.0 RESULTS AND DISCUSSION.....5

4.1 Caspian Tern.....6

4.1.1 Population Status.....6

4.1.2 Nest Sites and Materials.....7

4.1.3 Clutch Size and Nesting Chronology.....11

4.2 Arctic Tern.....11

4.3 Common Tern.....13

4.4 California Gull.....15

4.5 Herring Gull.....18

4.6 Mew Gull.....20

4.7 Bonaparte's Gull.....21

4.8 Parasitic Jaeger.....23

4.9 Other Bird Species.....25

4.9.1 Greater Scaup.....25

4.9.2 Rare Passerines.....27

4.9.3 Arctic Species.....28

5.0 KEY HABITAT SITE.....29

6.0 LITERATURE CITED.....30

7.0 APPENDICES.....33

LIST OF FIGURES

Figure Page

1. Location of the study area within Northwest Territories.....3

2. Distribution of breeding pairs of Caspian Terns between Yellowknife and Gros Cap, June 1987.....8

3. Distribution of breeding pairs of Arctic Terns between Yellowknife and Gros Cap, June 1987.....12

4. Distribution of breeding pairs of Common Terns between Yellowknife and Gros Cap, June 1987.....14

5. Distribution of breeding pairs of California Gulls between Yellowknife and Gros Cap, June 1987.....17

6. Distribution of breeding pairs of Herring Gulls between Yellowknife and Gros Cap, June 1987.....19

7. Distribution of breeding pairs of Mew Gulls between Yellowknife and Gros Cap, June 1987.....22

8. Distribution of breeding pairs of Parasitic Jaegers between Yellowknife and Gros Cap, June 1987.....24

LIST OF TABLES

Table — Page

1. Observations of other bird species between Yellowknife and Gros Cap, June 1987.....26

LIST OF APPENDICES

Appendix — Page

1. Scientific and English names of bird species mentioned in this report.....33

2. Number of active pairs at each larid breeding site between Yellowknife and Gros Cap, June 1987.....34

3. Clutch sizes of breeding larids between Yellowknife and Gros Cap, June 1987.....36

4. Location of larid breeding sites between Yellowknife and Gros Cap, June 1987.....37

1.0 INTRODUCTION

1.1 Key Habitat Sites

The Canadian Wildlife Service has recently completed a compilation of the key migratory bird terrestrial habitat sites in the Northwest Territories (McCormick et al. 1984). Any site which supports at least one percent of the Canadian population of a migratory bird species or subspecies, for any portion of the year, is considered to be a Key Habitat Site. Evaluations are based upon the best available estimates of national and regional populations and the number of individuals present at each site. Actual or potential sites are regularly surveyed to update or evaluate the numbers present.

Potential Caspian Tern breeding sites along the Yellowknife - Gros Cap sector of the North Arm of Great Slave Lake were surveyed because: 1) a 1986 survey of the Frank Channel - Yellowknife sector of the North Arm revealed 1,268 breeding pairs of eight species of larids including a significant population of Caspian Terns (McCormick and Sirois 1988), 2) the Caspian Tern is a vulnerable species (COSEWIC) in Canada (Martin 1978). Caspian Terns have been reported from only two locations in NWT - Akimiski Island and Great Slave Lake (Godfrey 1986; Weller et al. 1969), and 3) there is no comprehensive survey of the larid populations of Great Slave Lake.

1.2 Objectives

The objectives of this study were: 1) to determine the

distribution and abundance of Caspian Terns between Yellowknife and Gros Cap, 2) to determine the distribution and abundance of other larids in the same area, 3) to evaluate all or part of this sector of the North Arm as a potential Key Habitat Site, and 4) to record observations on other wildlife as time permitted.

2.0 STUDY AREA

The study area includes all of the islands along the north side of the North Arm of Great Slave Lake, from the eastern side of Yellowknife Bay to Gros Cap. It includes the East Mirage Islands and the islands in Goulet-Campbell bays (Fig. 1). The Whaleback Rocks were not surveyed and Iles Basses were given only cursory examination. The nearest community is Yellowknife (62° 27′ N, 114° 22′ W) which is adjacent to Yellowknife Bay (Fig. 1).

The physiography, vegetation, and climate of the study area were described in McCormick and Sirois (1988). Most islands between Yellowknife and Gros Cap are grouped in small archipelagos. The average nesting island was 90 m long, 50 m wide, and 3 m high (N=54). Sixty percent of these islands had an estimated vegetation cover of 5% or less, 30% had an estimated cover of 5 -25%, and 10% had an estimated cover of 25% or more. As indicated by numerous visits in previous years, spring break-up occurs up to one week later in the eastern portions of the study area than in the western portions. Water quality appeared uniform throughout the area; oligotrophic conditions prevailed at all sites.

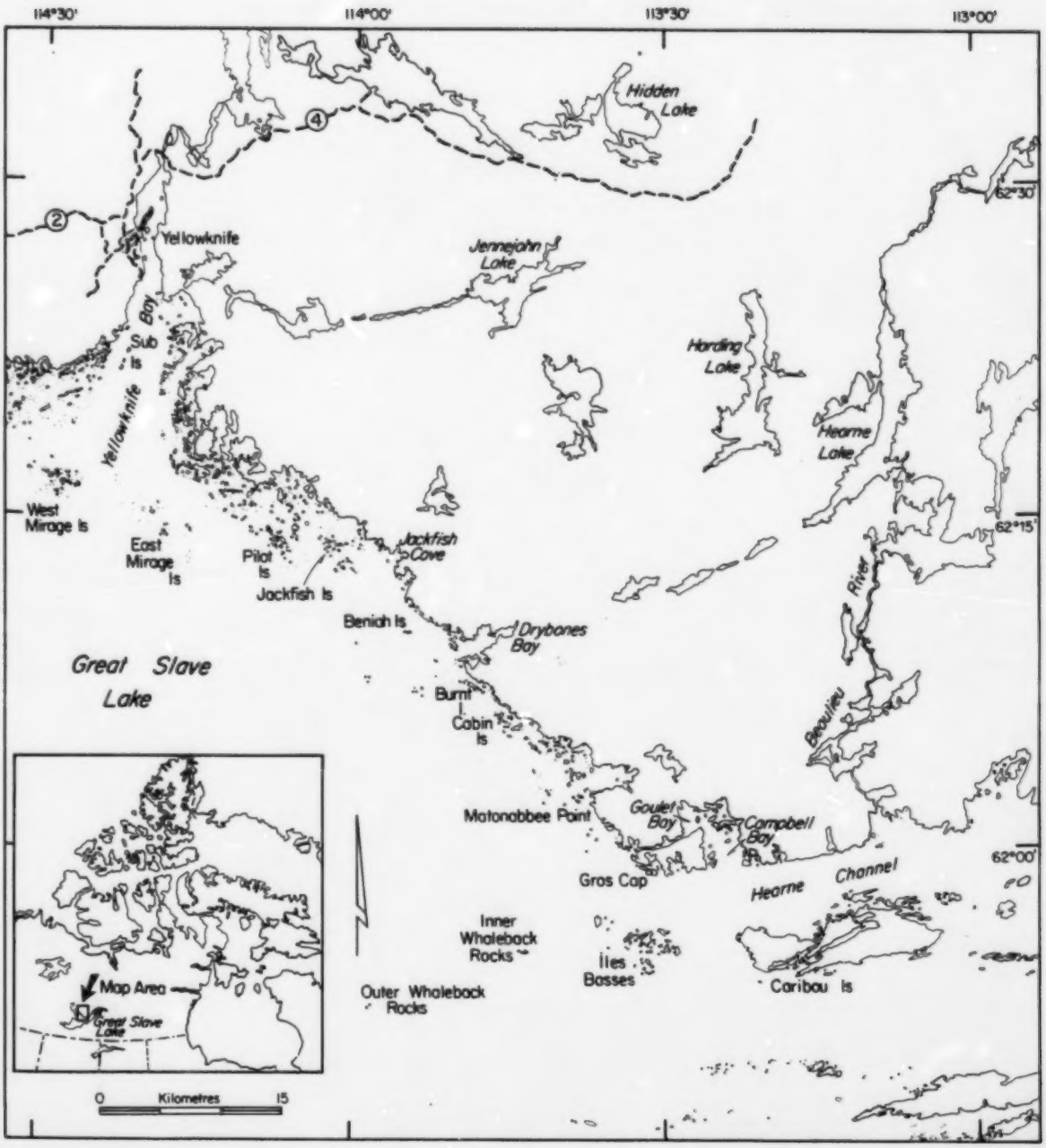


Figure 1. Location of the study area within Northwest Territories.

3.0 METHODS

Two observers in a motor boat examined all islands in the study area between 19-22 June 1987 (see Appendix 4). Surveys began by late morning and continued into the late evening as the lake waters were usually much calmer at this time of day. The location of islands was determined from 1:50,000 and 1:250,000 topographical maps, as appropriate.

The larids' obvious preference for the outer, more exposed, and unvegetated islands eliminated the need to survey many of the treed islands close to the mainland. The presence of Xanthoria elegans, a bright orange crustose lichen on many of the occupied islands, also facilitated the discovery of some breeding sites.

Generally, each island was considered as an individual breeding site. However, in some cases, a number of juxtaposed islands were considered as one unit. Colonies may be described as "a distinguishable localized population within a species" (Webster's New Collegiate Dictionary, 1981). As many of the islands were very close to each other we have referred to them as breeding sites rather than colonies (see Weseloh et al. 1986).

The number of nests of each larid species was determined by systematically searching each breeding site. Data were also collected on: clutch size, nest materials, egg dimensions, and presence of young where appropriate. Notes on the habitat features of Caspian Tern breeding sites were also taken. Disturbance to breeding birds was minimized by keeping our visits as short as possible.

4.0 RESULTS AND DISCUSSION

The distribution and population status of larids on Great Slave Lake is poorly known. Historical knowledge is limited to the general notes of the few explorers and biologists who passed through the area. A recent aerial survey (Allen and Ealey 1979) of raptors and colonial birds included the Yellowknife area and the East Arm of Great Slave Lake. However, the survey did not include the Yellowknife - Gros Cap sector of the North Arm.

A total of 49 breeding sites and seven species of larids were recorded within the study area (Appendix 2). As single breeding pairs of Caspian Terns, Arctic Terns, Mew Gulls, and Herring Gulls were common, numerous additional sites may have been overlooked. Over one third (19) of the sites supported a single species whereas two species were recorded at 14 sites and 10 sites supported three species. Four species were recorded at five sites and one site supported five species.

Seven hundred and ninety-six pairs of larids - an average of 16.2 pairs per site - were incubating eggs. Three main concentrations of nesting larids were identified: 24% of the pairs nested at the East Mirage Islands; 23% nested near Matonabbee Bay, and 22 % nested in the Drybones Bay - Beniah Islands area. In order of abundance, the California Gull, Herring Gull, Arctic Tern and Mew Gull were the most common species. Details on the various species are given below.

By comparison, 1,268 breeding pairs of larids were recorded at 73 sites between Yellowknife and Frank Channel in 1986. In

order of abundance, the most common species were the Common/Arctic Tern, Herring Gull, Ring-billed Gull and California Gull (McCormick and Sirois 1988).

4.1 Caspian Tern

4.1.1 Population Status

Limited historical records suggest that Caspian Terns have been present on Great Slave Lake since the mid-nineteenth century. Ross, in 1862, noted the species as rare on Great Slave Lake (Preble 1908). Preble, in 1901, "met with it but once.... when a single bird was seen flying over the shallow lagoons between the mouth of Slave River and Stone Island." In 1903, he "frequently noted the species at Fort Resolution, 20 June to 17 July, but seldom saw more than one or two at a time." He also saw several among the islands of the North Arm, between Yellowknife River and Fort Rae, and one on Lake Marian. Fairburn (1931) "noted one bird from Resolution" and Soper (1942) noted two near Fort Resolution on 6 July, 1932. William MacDonald observed Caspian Terns nesting near Trout Rock in June 1954 and also recorded them nesting on two islands (Twin Island and South Tern Islands) in Yellowknife Bay in 1958. Two nests were also recorded on the West Mirage Islands in 1956 (Trauger and Bromley 1976). Three pairs nested annually on the islands from 1968 through 1973 (Weller et al. 1969, Trauger and Bromley 1976). Sixty-five pairs were recorded between Frank Channel and Yellowknife in 1986 (McCormick and Sirois 1988). This total included a colony of 49 pairs near Trout Rock and 15 additional sites which supported one or two pairs.

Thirteen breeding pairs, at 13 sites, were observed during this survey (Fig. 2). Four non-nesting pairs were also recorded at sites No. 3, 12, 22, and 27 (Appendix 4). All breeding birds occurred as the sole Caspian Tern pair within a colony of other nesting larids. The most common associates were: Herring Gull - ten sites, California Gull - seven sites, Arctic Terns - five sites, and Mew Gull - five sites. At Site No. 17, one pair nested among as many as 52 pairs of Herring Gulls, 35 pairs of California Gulls, and four pairs of Mew Gulls. Conversely, at Site No. 49, a single pair nested close to a single pair of Herring Gulls. Association with other breeding larids is a characteristic of Caspian Tern breeding biology. There are few records of solitary pairs of breeding Caspian Terns (Bergman 1980, Vermeer 1970).

4.1.2 Nest Sites and Materials

In North America, the majority of Caspian Tern colonies occur on islands, usually far from the mainland (Martin 1978, Ludwig 1965). They nest on islands with little or no vegetation and they tend to nest on high ground, thus avoiding flooding. Nests in the Great Lakes were located on sand, gravel, or limestone substrates with sparse or no vegetation (Ludwig 1965, Weseloh *et al.* 1986). Birds in other areas have nested on sand, shingle, or cobblestone substrates, also with little or no vegetation (Evans *et al.* 1970, Webb 1973).

All nest sites between Yellowknife and Gros Cap were situated on islands or islets, which were Precambrian outcrops. Most

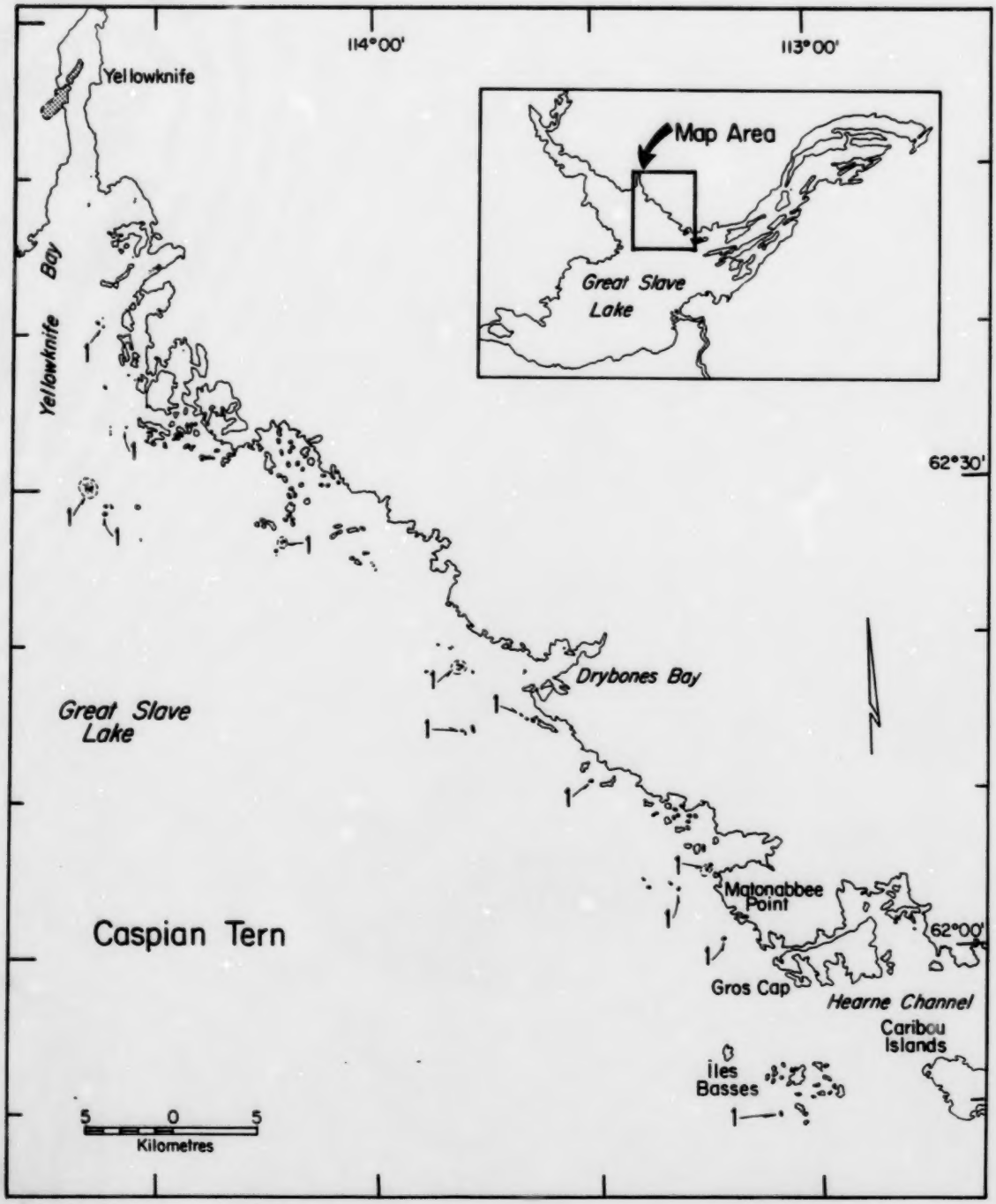


Figure 2. Distribution of breeding pairs of Caspian Terns between Yellowknife and Gros Cap, June 1987.

islands had smooth surfaces and rounded "sheepback" shapes. The 13 breeding islands averaged 95 m in length, 60 m in width, and three metres in height. Six islands had less than 10% of their surface covered by vegetation, six others had a 10-30% cover, and only one was half covered by vegetation. Most had no trees or shrubs; existing vegetation was often tundra-like. Only one nesting site (Site No. 26) was located less than one metre above the waterline, suggesting that it could be subject to storm flooding and drifting ice.

Bent (1921) reported that nests at one colony were deep hollows lined with various sticks, straw, and shells whereas, at another colony, nests were slight depressions or hollows with no lining. Ludwig (1965) reported that nests were a simple hollow in gravel, sometimes thinly lined with grasses. The amount and type of nest materials recorded during this survey were variable, reflecting both the substrate of the nest sites and the available nest materials. Nests which were located in rock crevices or tufts of grasses were usually a scrape lined with fragments of grass and fish bones. At Site No. 49, the eggs were laid directly on the rocks. One of the two eggs had fallen to a ledge 30 cm below the nest and was cold. At Site No. 17, the pair of Caspian Terns appeared to occupy a California Gull nest, as it was identical to those of California Gulls nesting nearby. This was also observed in 1986 between Yellowknife and Frank Channel.

4.1.3 Clutch Size and Nesting Chronology

On the Great Lakes, average clutch size of initial clutches of

Caspian Terns was 2.81 eggs (Ludwig 1965) although a small colony on Lake Ontario had an average clutch size of 2.0 in 1977 (Haymes and Blokpoel 1977 *in* Martin 1978). Evans *et al.* (1970) reported an average clutch size of 1.73 eggs in Manitoba whereas Trauger and Bromley (1976) reported a mean clutch size of 1.8 eggs at the West Mirage Islands. Sixty-five clutches examined in 1986 (McCormick and Sirois 1988) averaged 1.8 eggs. The thirteen clutches examined during this survey averaged 2.1 eggs. The clutches usually contained two eggs (69.2%), although three-egg clutches (23.0%) were not uncommon. A single one-egg clutch was also found. Average clutch size recorded during this survey is consistent with earlier observations in the region but noticeably less than that reported by Ludwig (1965). Smaller clutches could be due to predation, renesting or reduced availability of food (Soikkeli 1973b, Shugart *et al.* 1978). Further study is required to determine if these results are consistent from year to year.

No young and no sign of imminent hatching were observed during this survey. Soikkeli (1973b) reported that in the Baltic Sea, most eggs are laid by 20 May. In 1969, the onset of hatching in Lake Winnipegosis, Manitoba, occurred on June 14-15 (Evans *et al.* 1970). Eggs are laid at two or three-day intervals and incubation starts with the first egg (Bergman 1953 *in* Soikkeli 1973b). Incubation lasts approximately 26 days (Ludwig 1965). As the last nest was examined on 22 June, incubation apparently did not begin before the first week of June. This chronology is consistent with Trauger and Bromley's (1976) observation of two newly hatched young on 4 July 1970.

4.2 Arctic Tern

According to Preble (1908), the Arctic Tern replaces the Common Tern north of Great Slave Lake but occurs with that species in some localities. He found it common on Great Slave Lake, especially among the islands of the North Arm. Both Arctic and Common Terns have been reported from the West Mirage Islands but Arctic Terns appear to be the most abundant. Allen and Ealey (1979) reported one colony on an island in the North Arm. They suggest, from casual observations, that Arctic Terns are most common in the Yellowknife area. However, a comprehensive survey of breeding larids between Yellowknife and Frank Channel indicated that Common Terns were at least three times as common as Arctic Terns in that sector of the North Arm (McCormick and Sirois 1988).

The Arctic Tern was the third most common larid breeding in the study area. One hundred and fifty-two pairs were recorded at 19 sites (Fig. 3), yielding an average of eight pairs per site. Over 50% of all pairs were recorded in Yellowknife Bay but the biggest colony - 35 pairs - was found in Campbell Bay (Site No. 48). Four sites supported only Arctic Terns. Nesting associates were Mew Gulls - 11 sites, Herring Gulls - nine sites, Caspian Terns - five sites, California Gulls and Common Terns - two sites, and Parasitic Jaeger - one site. In the latter case, the pair of jaegers was nesting very close but on a separate islet. Contrary to the Frank Channel - Yellowknife sector where Arctic Terns were estimated to be at least three times less abundant than Common Terns, 96% of all small terns recorded between Yellowknife and

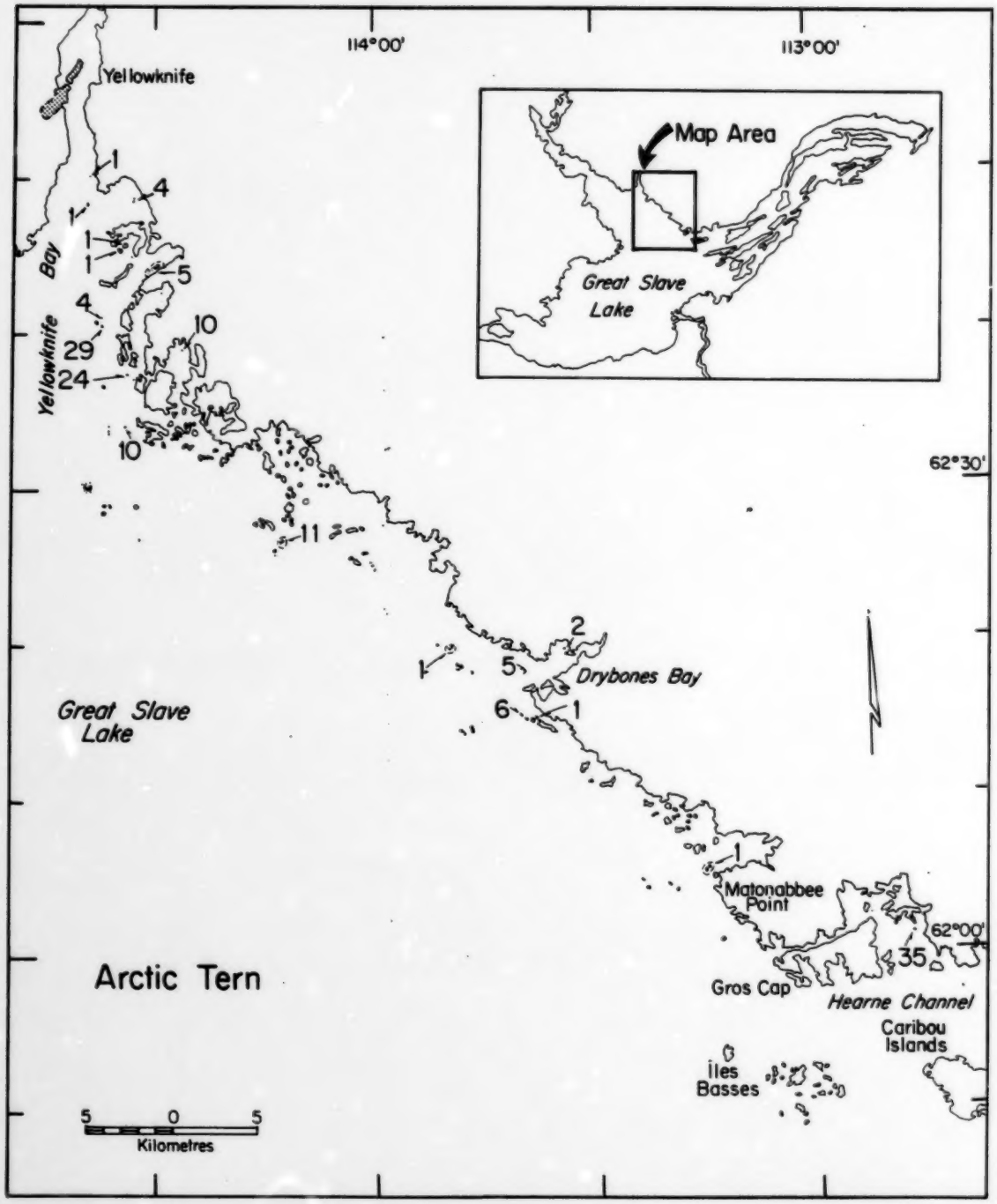


Figure 3. Distribution of breeding pairs of Arctic Terns between Yellowknife and Gros Cap, June 1987.

Gros Cap were Arctic Terns.

Clutches contained predominantly two eggs (54%), although three-egg clutches were also common (34%). Thirteen percent of the clutches had a single egg (Appendix 3). No young or evidence of hatching was recorded. In 1986, many hatchlings were recorded between Frank Channel and Yellowknife, on 23-26 June. We suspect that no young was observed in 1987 because the survey was done earlier (19-22 June). Also break-up occurred later than in 1986 (Sirois 1987) hence a later date for egg laying and hatching. The incubation period of Arctic Terns is approximately 21 days (Godfrey 1986).

4.3 Common Tern

Seven pairs of Common Terns were found at two breeding sites in Yellowknife Bay (Fig. 4). In both instances, they were nesting among Arctic Terns, and in one case, with a pair of Herring Gulls. In all cases, they were easily distinguished from Arctic Terns by their slightly bigger size, darker underparts, stronger black-tipped bill, and the different pitch of their calls. All identifications were mutually agreed upon by the two observers. All seven pairs were matched to nests that were different to Arctic Terns' nests by being in the lower, more vegetated reaches of the nesting islands. Their nests contained more vegetation, and usually featured a better defined cup. In some cases however, these differences were minimal. Three nests contained two eggs and the other four contained three eggs.

In 1986, Common Terns were estimated to be at least three times

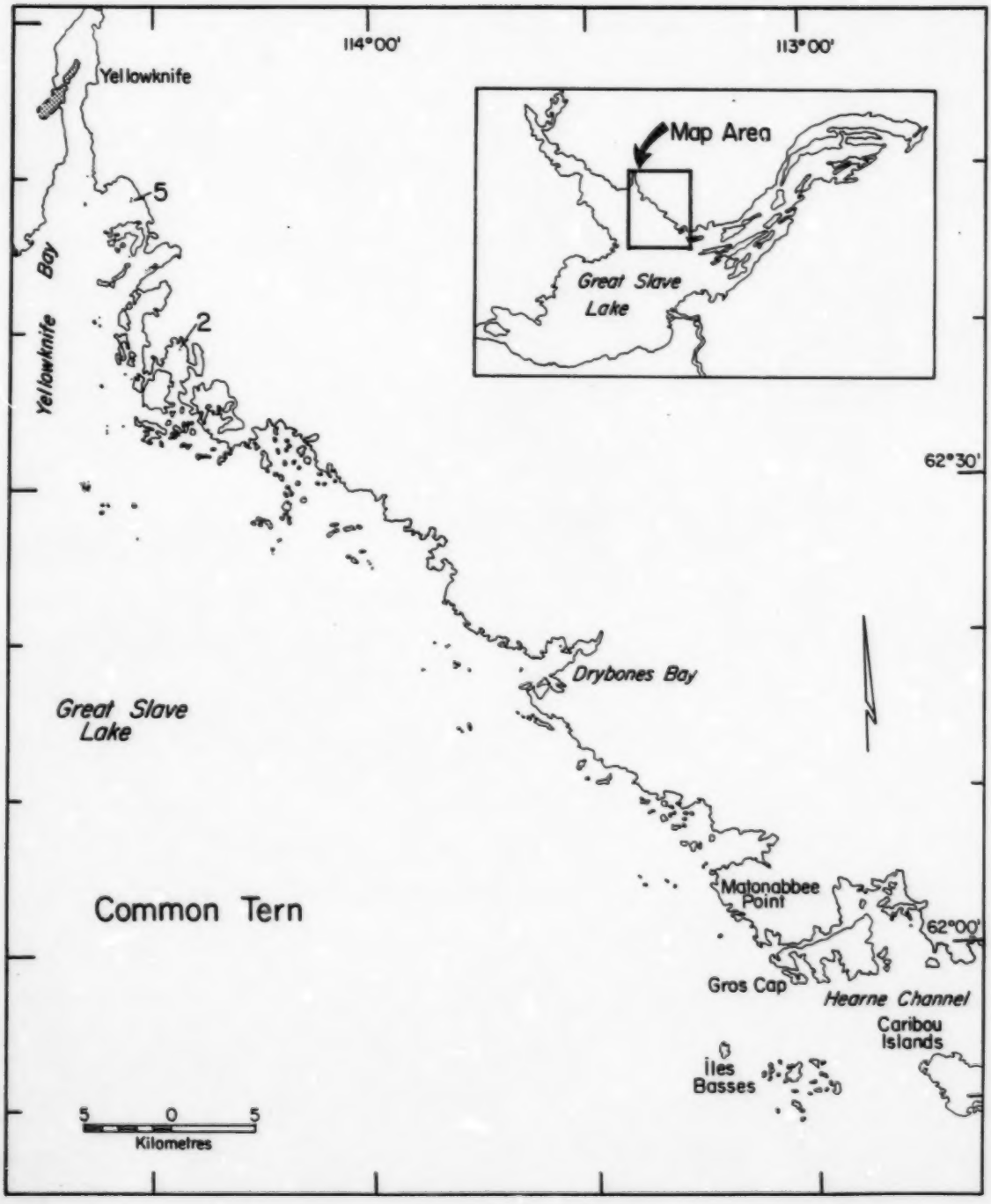


Figure 4. Distribution of breeding pairs of Common Terns between Yellowknife and Gros Cap, June 1987.

as abundant as Arctic Terns west of Yellowknife Bay, between Frank Channel and Yellowknife. In 1987, only one pair of Common Terns was observed east of Yellowknife Bay - in Drybones Bay - but no evidence of breeding was recorded. The concentration of Common Terns in the western portion of the North Arm is a probable response to ice break-up patterns. East of Yellowknife Bay, break-up occurs later as one gets closer to the frigid East Arm. As the incubation period of Common Terns lasts 26 days (Godfrey 1986), a few days longer than that of the Arctic Tern, we suspect that Common Terns prefer areas where break-up occurs earlier and insects emerge earlier. Open waters and ice-free wetlands are available at least one week earlier in the western portion of the North Arm.

4.4 California Gull

Preble (1908) considered the California Gull to be a common breeder about Great Slave Lake. In 1901, he first noted it at Fort Resolution, on 8 July. The species was abundant about Loon Island, on 11-14 July, where 60 to 70 pairs were nesting on a small adjoining island. A few were seen near Trout Rock on 16 July and at Fort Rae on 24 July. Many were seen near Hardisty Island on 30 July. In 1903, he observed this species several times among the islands between Fort Resolution and Fort Rae, on 17-26 July. In 1952, J. Dewey Soper proposed to designate Egg Island, near Fort Resolution, as a bird sanctuary as he observed approximately 6,000 California Gulls at this location. He suggested that up to 10,000 gulls may be present on the island at the end of the summer.

Trauger and Bromley (1976) reported that 150-200 pairs nested annually on the West Mirage Islands between 1969 and 1973. Apparently the population was considerably larger in the past for an estimated 250 nests were recorded on the westernmost island in 1956. In 1986, only 17 pairs were counted at the West Mirage Islands and only 92 pairs nested at five locations between Frank Channel and Yellowknife. All nesting sites were in or near Yellowknife Bay; the largest colony contained 44 pairs. The apparent decline of this species near Yellowknife is discussed in McCormick and Sirois (1988).

In 1987, the California Gull was the most common breeding larid between Yellowknife and Gros Cap. Three hundred and thirty-four pairs nested at 16 sites, yielding an average of 21 pairs per site (Fig. 5). The largest colony (Site No. 44) contained 81 pairs. A single pair nested with four pairs of Herring Gulls at Site No. 42, but like Common Terns, they were never observed nesting alone. At all breeding sites California Gulls nested with other species. They occurred in association with Herring Gulls - 15 sites, Caspian Terns - seven sites, Mew Gulls - three sites, and Arctic Terns - two sites. They nested with all these species only at Site No. 34.

Trauger and Bromley (1976) recorded a mean clutch size of 2.1 (114 nests) whereas Weller et al. (1969) noted an average clutch size of 1.9 (92 nests). The average clutch size of 2.3 eggs (334 nests) recorded during this study is consistent with earlier observations. Predominant clutch sizes were: three eggs (46%), two eggs (42%), and one egg (12%). No chicks were observed but

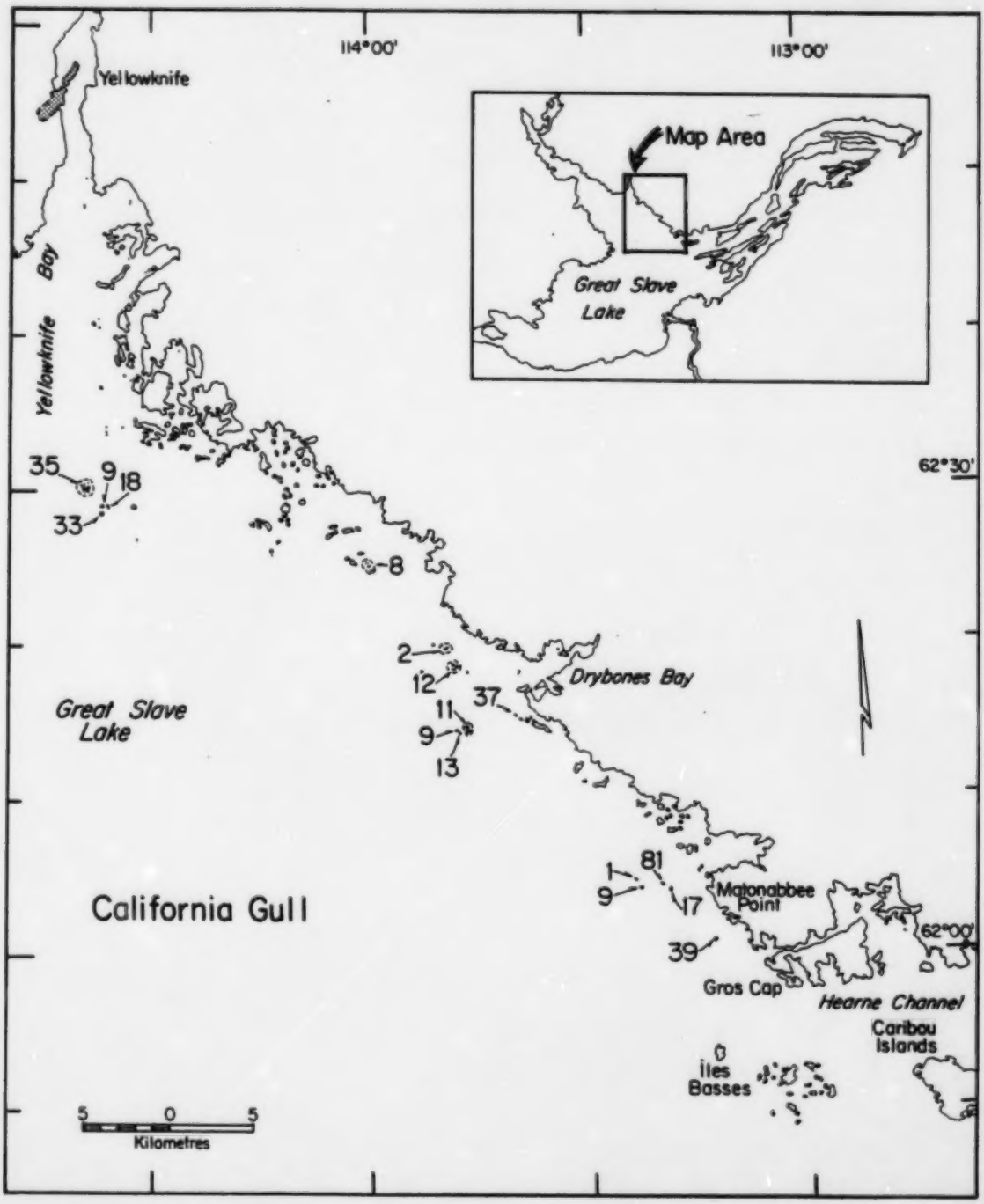


Figure 5. Distribution of breeding pairs of California Gulls between Yellowknife and Gros Cap, June 1987.

one egg was pipped at Site No. 45. As the incubation period of the first egg is approximately 27 days (Godfrey 1986), some eggs were probably laid as early as 26 May.

California Gulls associated with Herring Gulls at most breeding islands but differed in many respects. Their smaller nests were always lined with feathers, and their colonies were usually denser and lower on the nesting islands. They also reacted differently to disturbance. Unlike Herring Gulls, they usually came back to their nests as soon as an intruder moved three to four metres away.

4.5 Herring Gull

Preble (1908) indicated that Herring Gulls were common on Great Slave Lake around Fort Resolution and between there and Fort Rae during the month of July. In 1968, Weller et al. (1969) reported 22 nests on the West Mirage Islands and 35 additional nests were were found there between 1969 and 1973. An estimated 40-60 pairs nested regularly on the islands during this period (Trauger and Bromley 1976). In 1986, the Herring Gull was the most abundant gull species between Frank Channel and Yellowknife. Forty-one breeding sites, mostly between Trout Rock and Yellowknife Bay, supported a total of 380 breeding pairs, 82 of which at the West Mirage Islands. The apparent increase of this species near Yellowknife is discussed in McCormick and Sirois (1988).

The Herring Gull was the second most abundant larid between Yellowknife and Gros Cap. Thirty-three breeding sites supported 245 pairs, yielding an average of 7.4 pairs per site (Fig. 6).

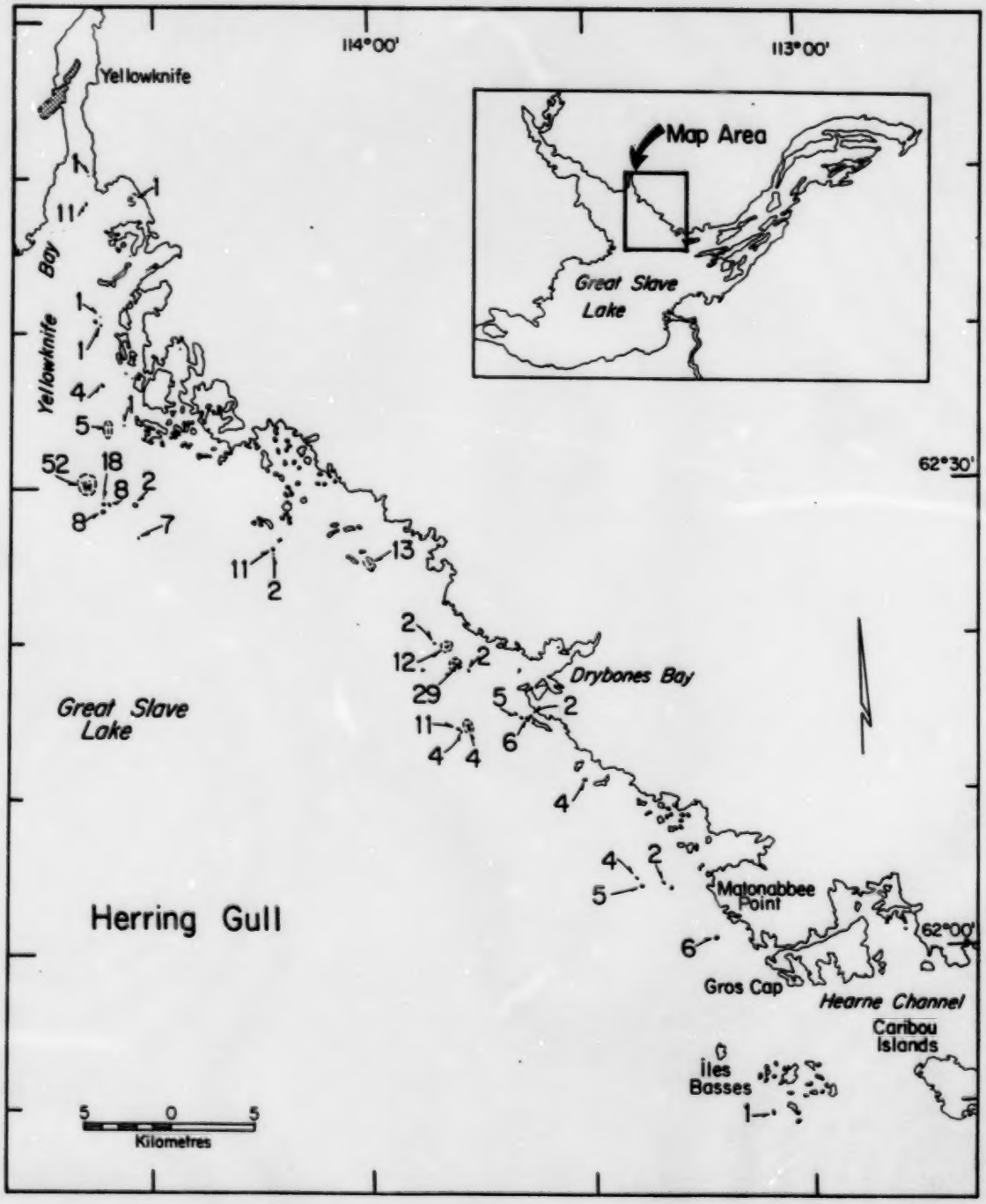


Figure 6. Distribution of breeding pairs of Herring Gulls between Yellowknife and Gros Cap, June 1987.

Up to 52 pairs nested at Site No. 52, but single pairs nested at many sites. Nine sites supported Herring Gulls only; other associates were California Gulls - 15 sites, Caspian Terns - ten sites, Arctic Terns - nine sites, Mew Gulls - seven sites, and Common Terns - one site. Herring Gulls were spread throughout the study area but were more concentrated at the East Mirage Islands and near Drybones Bay.

Clutches contained predominantly two eggs (47%), three eggs (38%) and one egg (14%); they averaged 2.2 eggs. Pipped eggs and young were recorded at 18 sites. In many cases, entire clutches had hatched and judging by their swimming abilities, the young were at least a few days old. As incubation takes 25-28 days (Godfrey 1986), eggs may have been laid as early as 23 May.

4.6 Mew Gull

In 1901, Preble passed by a large colony between Yellowknife Bay and Trout Rock. Many young birds were present on 16 July. In 1903, he found the species common among the islands of the North Arm, on 24-26 July. Many young birds were just commnecing to fly. Trauger and Bromley (1976) reported that three to five pairs nested on the larger wooded islands at the West Mirage Islands. In 1986, McCormick and Sirois encountered 49 active nests at 18 sites between Frank Channel and Yellowknife. Only one pair was seen at the West Mirage Islands and at most other sites. The largest colony (Site No. 69) was near Yellowknife and comprised 24 pairs. As this species does not prefer the outer, exposed islets but usually nests on sheltered, treed islands near the

mainland, some colonies may have been missed.

Forty-one nests were recorded at 13 sites, yielding an average 3.1 nests per site. The biggest colony, which contained 19 active nests, was located in Matonabbee Bay (Fig. 7). This is the second largest known colony in Great Slave Lake. Mew Gulls were the sole breeders at two sites. Associated breeding species included: Arctic Terns - ten sites, Herring Gulls - seven sites, Caspian Terns - five sites, California Gulls - three sites, and Parasitic Jaeger - one site. In the latter case, a pair of jaegers nested on a separate islet in very close proximity.

The mean clutch size of 42 nests was 2.1 eggs. This is consistent but lower than that (2.6 eggs per clutch) observed between Frank Channel and Yellowknife. Observed clutch sizes were: three eggs (36%), two eggs (38%), and one egg (26%). As the incubation lasts 22-23 days (Godfrey 1986) and no sign of hatching was recorded, eggs were not laid until the first week of June. Freshly predated eggs and three empty nests were seen at Site No. 5. Common Ravens were the likely predators as they were harassing other pairs of Mew Gulls nearby. Three active nests and 11 empty nests were found at Site No. 7 but no fresh sign of predation was observed.

4.7 Bonaparte's Gull

This species is a fairly common breeder in our region (Bromley and Trauger n.d.) but is uncommon in Great Slave Lake during the breeding season. It is commonly observed inland, in wetlands and smaller lakes of the Precambrian Shield. Flocks of 2-6 birds were

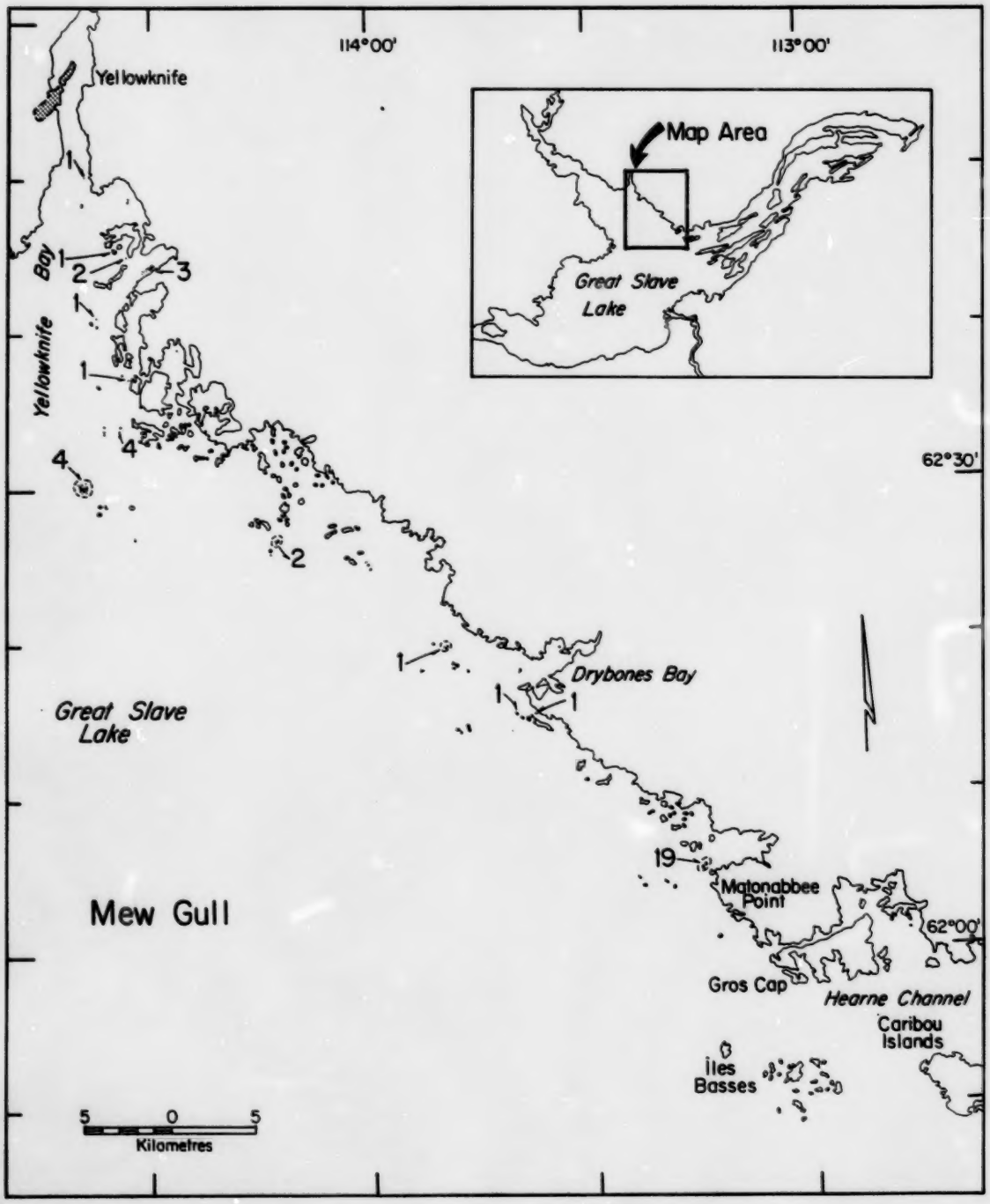


Figure 7. Distribution of breeding pairs of Mew Gulls between Yellowknife and Gros Cap, June 1987.

regularly observed along the Yellowknife Highway between Yellowknife and Fort Rae during the summers of 1986 and 1987 (M. Fournier and G.B. Cameron, pers. obs.). One pair and their empty nest were found in a tree next to a Mew Gull colony (Site No. 69) in Yellowknife Bay, in 1986 (McCormick and Sirois 1988). Four individuals were observed foraging in Drybones Bay but no evidence of breeding was recorded between Yellowknife Bay and Gros Cap. This species usually nests in trees (Godfrey 1986) and is therefore more likely to be found on treed islands near the mainland. Some nesting pairs may have been missed as the outer, exposed islands were surveyed more intensively. In our region, breeding pairs also appear to nest solitarily or in small and "loose" colonies, rendering their detection even more difficult.

4.8 Parasitic Jaeger

Preble (1908) encountered this species several times between Fort Resolution and Fort Rae. Trauger and Bromley (1976) recorded five breeding pairs at the West Mirage Islands and two or three pairs were noted in subsequent years. In 1986, McCormick and Sirois observed 14 individuals, including four pairs, between Yellowknife Bay and Frank Channel but no egg or young was found.

Four breeding pairs were encountered at four sites between Yellowknife and Gros Cap (Fig. 8). Two pairs nested at the Pilot Islands. Three single individuals and one additonal pair - whose nest was not found- were also observed. In all cases, the nesting adults were incubating two eggs, and performed lengthy broken-wing displays. All nests were located in the open, on the highest

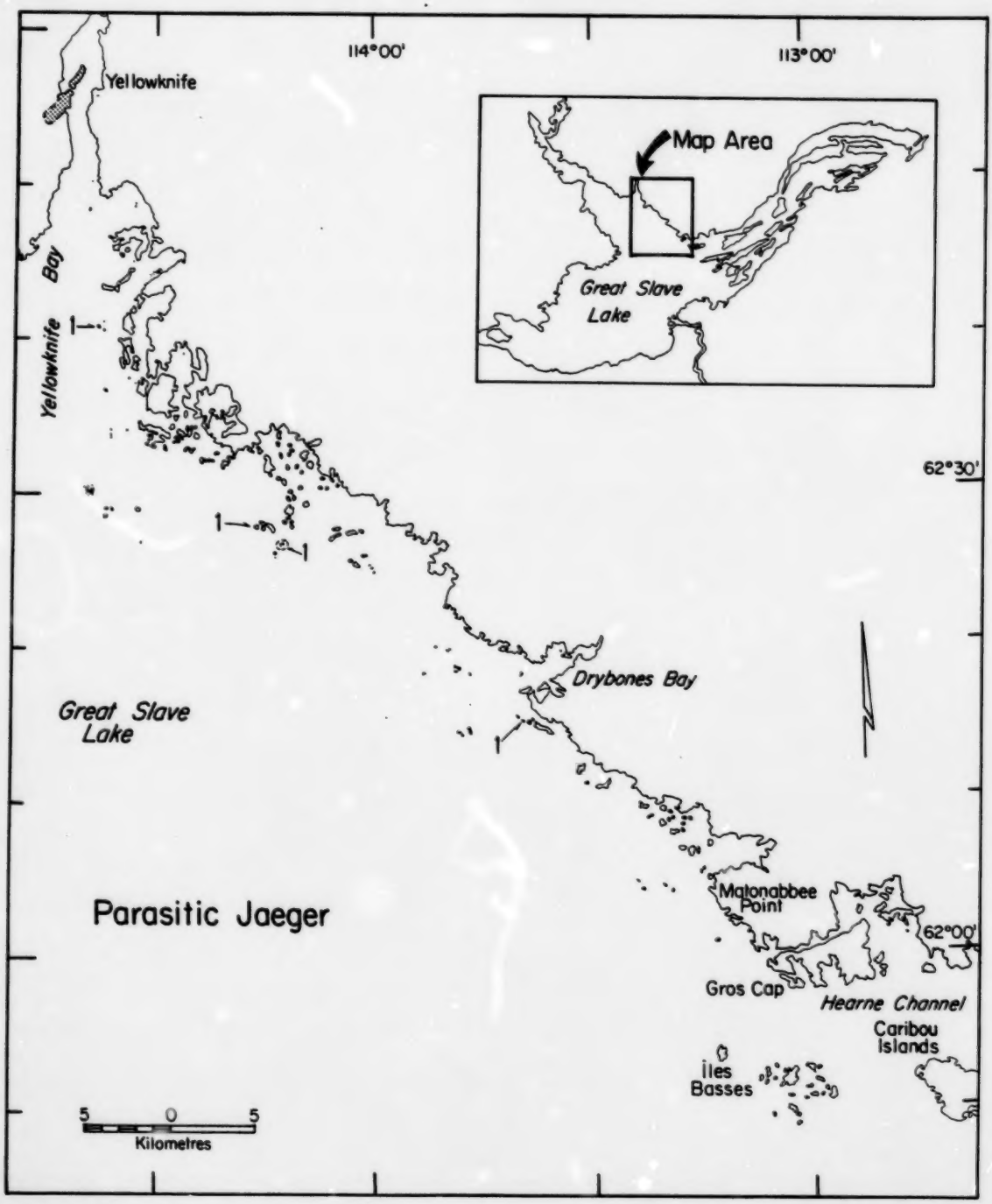


Figure 8. Distribution of breeding pairs of Parasitic Jaegers between Yellowknife and Gros Cap, June 1987.

reaches of the nesting islands. In two cases, the eggs were laid directly on the bedrock and at the two other sites, they were laid on flattened Empetrum nigrum. No sign of hatching was recorded. As incubation lasts 23-28 days (Godfrey 1986), eggs could have been laid in late May. Two pairs consisted of dark-phase individuals, one pair comprised two light-phase birds, and the fourth pair was mixed. This is consistent with Harrison (1983) who states that the dark morph predominates in the southern reaches of this species' range.

Jaegers were frequently seen to interact with other larids during the survey. They elicited strong mobbing reactions from nesting terns and gulls. Like Common Ravens and Bald Eagles, they appear to be an omnipresent predator near larid colonies. As witnessed at the East Mirage Islands, the Northern Pike (Esox lucius) is another predator of larids in Great Slave Lake. One pike ate a young Herring Gull swimming between two islets at Site No. 17.

4.9 Other Bird Species

Observations of other bird species are summarized in Table 1. Noteworthy observations include those of Greater Scaup, Red-eyed Vireo, Clay-colored Sparrow, Lapland Longspur, Lesser Golden-Plover, and Dunlin.

4.9.1 Greater Scaup

In 1986, McCormick and Sirois found 38 scaup nests between Frank Channel and Yellowknife while searching for larid nests.

Table 1. Observations of other birds between Yellowknife and Gros Cap, 19-22 June 1987.

Site Number	Remarks
1	Greater Scaup - 18*
2	Greater Scaup - 10
3	Spotted Sandpiper - 4
6	Northern Pintail - 8
7	Greater Scaup - 9; Common Loon - 1
14	Greater Scaup - 14; Common Loon - 2; Red-breasted Merganser - 8
17	Greater Scaup - 8; 1 Lapland Longspur; 1 Dunlin
18	Greater Scaup - 10
19	2 Canada Geese; 1 Dunlin
20	Greater Scaup - 7; 1 Lapland Longspur
21	Bald Eagle - 1 young
24	Greater Scaup - 10
26	Northern Pintail - 6
27	1 Clay-colored Sparrow
30	Greater Scaup - 13; 4 Canada Geese
32	Greater Scaup - 10
33	2 Lesser Yellowlegs; 2 Common Terns; 1 Red-eyed Vireo
36	Greater Scaup - 9, 9, 8; Northern Pintail - 8; 2 Lesser Golden-Plovers
37	Greater Scaup - 10
40	Greater Scaup - 11
48	Greater Scaup - 10, 13, 12, 8, 4, 19
49	Northern Pintail - 6

* Size of clutches; if number is before species, it represents the number of individuals.

Although it proved impossible to identify the hens, other observations (Weller et al. 1969, Trauger and Bromley 1976) suggest that both scaup species occur in the North Arm. The Lesser Scaup apparently nests closer to the mainland whereas the Greater Scaup nests in more exposed locales such as the West Mirage Islands. Twenty-one nests of Greater Scaup were discovered at 14 larid breeding sites between Yellowknife and Gros Cap. Up to six nests were found in the midst of an Arctic Tern colony (Site No. 48). Several previous reports (Hilden 1964, Vermeer 1968, Dwernychuk and Boag 1971) suggest that ducks commonly nest in association with larids. Larids protect the duck nests from predation but gulls may extract a toll when the ducklings leave their nest. However, it appears that ducks can only benefit from their association with Arctic Terns or Common Terns. Given their small size and diet (insects and small fish), terns are likely unable to swallow ducklings.

4.9.2 Rare Passerines

Two rare species of passerines (Bromley and Trauger n.d.) were recorded during the survey. Both species are widespread in southern Canada but restricted to the southern Mackenzie District in NWT (Godfrey 1986). One Red-eyed Vireo was repeatedly heard in tall Aspens (Populus tremuloides) in Drybones Bay, and one Clay-colored Sparrow was repeatedly heard and seen on a dry islet among the Jackfish Islands. Both birds were apparently performing breeding calls in suitable nesting habitat in breeding season. Accordingly, we considered them as possible breeders (see Cadman et al. 1987).

Consequently, the Red-eyed Vireo is not a summer transient as suggested by Bromley and Trauger, but a possible breeder. In 1986, another individual apparently performing breeding calls was recorded along Boundary Creek, near Yellowknife (J. Sirois, pers. obs.). The status of the Clay-colored Sparrow as a rare summer resident which likely breeds in the area (Bromley and Trauger n.d.) is corroborated by our observation. No Red-eyed Vireo and only five Clay-colored Sparrows have been mist-netted during the spring migration in Yellowknife between 1985 and 1989 (Sirois et al. 1987 and unpubl. data). Neither species was recorded on two Breeding Bird Survey routes near Yellowknife in 1988 (CWS unpubl. data).

4.9.3 Arctic Species

Lapland Longspurs and Lesser Golden-Plovers are common spring migrants around Great Slave Lake but they are rarely observed in late June. Both species normally breed on the Arctic tundra (Godfrey 1986). Our observations were likely of late migrants or non-breeders as no evidence of breeding was recorded. Several Arctic breeders (Red-throated Loon, Parasitic Jaeger, Red-necked Phalarope, Arctic Tern) nest in subarctic Great Slave Lake.

Additional Arctic breeders were observed at the East Mirage Islands: two Dunlins. They also appeared to be late spring migrants. The Dunlin does not appear on Bromley and Trauger's regional bird checklist. Based on this record, it should be added as Rare Summer Transient.

5.0 KEY HABITAT SITE

Recent estimates suggest that there are between 7,700 and 8,200 pairs of Caspian Terns breeding in Canada (H. Blokpoel, B. Koonz, K. Roney, S. Houston, A. Smith, S. Bretchel, W. Campbell, G. Chapdelaine, T. Lock, G. Morrison, pers. comm.; Cairns et al. 1986, McCormick and Sirois 1988). Thirteen breeding pairs of Caspian Terns were found to breed between Yellowknife and Gros Cap in 1987. This total represents much less than one percent of the national population and accordingly, the Yellowknife Bay - Gros Cap sector of the North Arm does not qualify as a Key Habitat Site. However, if added to the 65 pairs found between Frank Channel and Yellowknife Bay in 1986, 78 pairs nest between Frank Channel and Gros Cap, on the north coast of the North Arm of Great Slave Lake. This represents approximately 1% of the Canadian breeding population. Accordingly, this area is a Key Habitat Site for this species (see McCormick et al. 1984). Additional surveys to further define the Caspian Tern population of Great Slave Lake are recommended.

6.0 LITERATURE CITED

Allen, D.L. and D.M. Ealey. 1979. Raptors and colonial birds of the Yellowknife area and East Arm of Great Slave Lake, NWT. Unpubl. Rept., Can. Wildl. Serv., Yellowknife. 58 pp.

Bent, A. C. 1921. Life histories of North American gulls and terns. Bull. No. 113, U.S. Nat. Mus., Dover Reprint 1963. 337 pp.

Bergman, G. 1980. Single-breeding versus colonial breeding in the Caspian Tern Hydroprogne caspia, the Common Tern Sterna hirundo and the Arctic Tern Sterna paradisea. Ornis Fennica 57:141-152.

Bromley, R.G., and D.L. Trauger. no date. Birds of Yellowknife - A regional checklist. Yellowknife. 12 pp.

Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner. 1987. Atlas of the breeding birds of Ontario. Univ. of Waterloo Press. Waterloo. 617 pp.

Cairns, D.K., R.D. Elliot, W. Threlfall, and W.A. Montevecchi. 1986. Reasearcher's guide to Newfoundland seabird colonies. Addit. Biol. Pub. No. 10., Memorial Univ. St-John's. 54 pp.

Dwernychuk, L.W. and D.A. Boag. 1971. Ducks nesting in association with gulls - an ecological trap? Can. J. Zool. 50: 559-563.

Evans, R.M., D.B. Krindle and M.E. Mattson. 1970. Caspian Terns nesting near Spruce Island, Lake Winnipegosis, Manitoba. Blue Jay. 28: 68-71.

Fairburn, H.W. 1931. Notes on mammals and birds from Great Slave Lake. Can. Field-Nat. 45:158-162

Godfrey, E. W. 1986. Birds of Canada. Revised Edition. Nat. Mus. Can., Ottawa. 595 pp.

Harrison, P. 1983. Seabirds. Houghton Mifflin Co. Boston. 448 pp.

Haymes, G.T and H. Blokpoel. 1977. Reproductive success of larids nesting on the eastern headlands of Toronto outer harbour in 1977. Unpubl. Ms., Can. Wildl. Serv., Ottawa.

Hilden, O. 1964. Ecology of duck populations in the island group of Valassaaret, Gulf of Bothnia. Ann. Zool. Fenn. 1:153-279.

Ludwig, J.P. 1965. Biology and structure of the Caspian Tern (Hydroprogne caspia) population of the Great Lakes from 1896-1964. Bird. Band. 36:217-233.

Martin, M. 1978. Status report on Caspian Tern, Sterna caspia, in Canada. Comm. Stat. End. Wildl. Can., Ottawa. 42 pp.

McCormick, K.J. and J. Sirois. 1988. Larid breeding sites along the North arm of Great Slave Lake, Northwest Territories. Tech. Rept. No.30, Can. Wildl. Serv., Yellowknife.

McCormick, K.J., M.E. Adams, C.J. Stephenson, and A.S. Goodman. 1984. Key migratory bird terrestrial habitat sites in the Northwest Territories. Tech. Rept. 84-6, Can. Wildl. Serv., Yellowknife. 175 pp.

Preble, E.A. 1908. A biological investigation of the Athabasca-MacKenzie Region. North Amer. Fauna No. 27, Bur. Biol. Survey, Washington. 574 pp.

Ross, B.H. 1862. On the mammals and birds etc. of the Mackenzie River District. Nat. Hist. Review 2:269-290.

Shugart, G.W., W.C.Scharf and F.J. Cuthbert. 1978. Status and reproductive success of the Caspian Tern (Sterna caspia) in the U.S. Great Lakes. Proc. Col. Waterbird Group: 146-156.

Sirois, J. 1987. Spring migration of waterfowl in the Yellowknife - Thor Lake area, Northwest Teritories: 1987. Tech. Rept. Ser. No. 32, Can. Wildl. Serv. Yellowknife. 38 pp.

Sirois, J., K.J. McCormick, M.A. Molozzi, and G.B. Cameron. 1987. A mist-net study of migrating birds at Yellowknife, Northwest Territories: Spring 1985. Tech. Rept. Ser. No. 33, Can. Wildl. Serv. Yellowknife. 27 pp.

Soikkeli, M. 1973b. Breeding success of the Caspian Tern in Finland. Bird. Band. 44: 196-204.

Soper, J. D. 1942. The birds of Wood Buffalo Park and vicinity, northern Alberta, and District of MacKenzie, NWT, Canada. Trans. Roy. Can. Inst. 24:19-97

Soper, J.D. 1952. Proposed Bird Sanctuary, Egg Island, Great Slave Lake, NWT. Unpub. rept. Can. Wildl. Serv. Edmonton. 5 pp.

Trauger, D.L. and R.G. Bromley. 1976. Additional bird observations on the West Mirage Islands, Great Slave Lake, Northwest Territories. Can. Field-Nat. 90:114-122.

Vaisenen, R.A. 1973. Establishment of colonies of Caspian Tern by deserting flights the northern Gulf of Bothia. Ornis Scand. 4:47-53.

Vermeer, K. 1968. Ecological aspects of ducks nesting in high densities among larids. Wilson Bull. 80:78-83.

Vermeer, K. 1970. Large colonies of Caspian terns on lakes Winnipeg and Winnipegosis, 1970. Blue Jay 28:117-119.

Webb, R. 1973. Wildlife resource impact assessment Lake Winnipeg, Churchill and Nelson rivers. Hydroelectric Projects. No.2, Southern Indian Lake. F.F. Slaney and Co. Ltd., Vancouver.

Weller, M.W., D.L. Trauger and G.L. Krapu. 1969. Breeding birds of the West Mirage Islands, Great Slave Lake, NWT. Can. Field-Nat. 83:344-360.

Weseloh, D.V, P. Mineau, S. M. Temple, H. Blokpoel and B. Ratcliff. 1986. Colonial waterbirds nesting in Canadian Lake Huron in 1980. Prog. Note No. 165, Can. Wildl. Serv., Ottawa. 28 pp.

Appendix 1. Scientific and English names of birds species mentioned in this report.

Family	Scientific name	English name
Gaviidae	Gavia immer	Common Loon
	Gavia stellata	Red-throated Loon
Anatidae	Branta canadensis	Canada Goose
	Anas acuta	Northern Pintail
	Aythya marila	Greater Scaup
	Aythya affinis	Lesser Scaup
	Mergus serrator	Red-breasted Merganser
Accipitridae	Haliaeetus leucocephalus	Bald Eagle
Charadriidae	Pluvialis dominica	Lesser Golden-Plover
Scolopacidae	Tringa flavipes	Lesser Yellowlegs
	Actitis macularia	Spotted Sandpiper
	Phalaropus lobatus	Red-necked Phalarope
	Calidris alpina	Dunlin
Laridae	Stercorarius parasiticus	Parasitic Jaeger
	Larus argentatus	Herring Gull
	Larus californicus	California Gull
	Larus philadelphia	Bonaparte's Gull
	Larus delawarensis	Ring-billed Gull
	Larus canus	Mew Gull
	Sterna paradisaea	Arctic Tern
	Sterna hirundo	Common Tern
	Sterna caspia	Caspian Tern
Vireonidae	Vireo olivaceus	Red-eyed Vireo
Emberizidae	Spizella pallida	Clay-colored Sparrow
	Calcarius lapponicus	Lapland Longspur

Appendix 2. Number of active* pairs at each larid breeding site between Yellowknife and Gros Cap, June 1987.

Site Number	Location UTM Grid	CATE	ARTE	COTE	HEGU	CAGU	MEGU	PAJE
1	PV 3835 2347		1		1		1	
2	PV 3822 2205		1		11			
3	PV 4100 2210		4	5	1			
4	PV 4025 1905		1				1	
5	PV 4065 1945		1					
6	PV 4115 1870						2	
7	PV 4235 1810		5				3	
8	PV 3940 1487		4		1		1	
9	PV 3915 1475							1
10	PV 3943 1450	1	29		1			
11	PV 3955 1100				4			
12	PV 4107 1155		24					
13	PV 4155 1145						1	
14	PV 4435 1350		10	2				
15	PV 4005 0855				5			
16	PV 4105 0835	1	10		1		4	
17	PV 3900 0456	1			52	35	4	
18	PV 4000 0373				18	9		
19	PV 4025 0373				8	18		
20	PV 4000 0330	1			8	33		
21	PV 4190 0375				2			
22	PV 4217 0200				7			
23	PV 4905 0310							1
24	PV 5017 0155				11			
25	PV 5033 0133				2			
26	PV 5065 0215	1	11				2	1
27	UE 4407 0040				13	8		
28	UD 4785 9610				2			
29	UD 4835 9560		1		12	2	1	
30	UD 4900 9450	1			29	12		
31	UD 4975 9440				2			
32	UD 5270 9395		5					
33	UD 5510 9517		2					
34	UD 5205 9170	1	6		5	37	1	
35	UD 5023 9110				4	11		
36	UD 4935 9075	1			11	9		
37	UD 4950 9065				4	13		
38	UD 5270 9130							1
39	UD 5290 9111				6			
40	UD 5310 9115		1		2		1	
41	UD 5620 8725	1			4			
42	UD 5875 8120				4	1		
43	UD 5915 8080				5	9		
44	UD 6030 8080				2	81		
45	UD 6090 8060	1				17		

Appendix 2. Continued.

Site Number	Location UTM Grid	CATE	ARTE	COTE	HEGU	CAGU	MEGU	PAJE
46	UD 6267 8177	1	1				19	
47	UD 6340 7745	1			6	39		
48	UD 7507 7730		35					
49	UD 6620 6665	1			1			

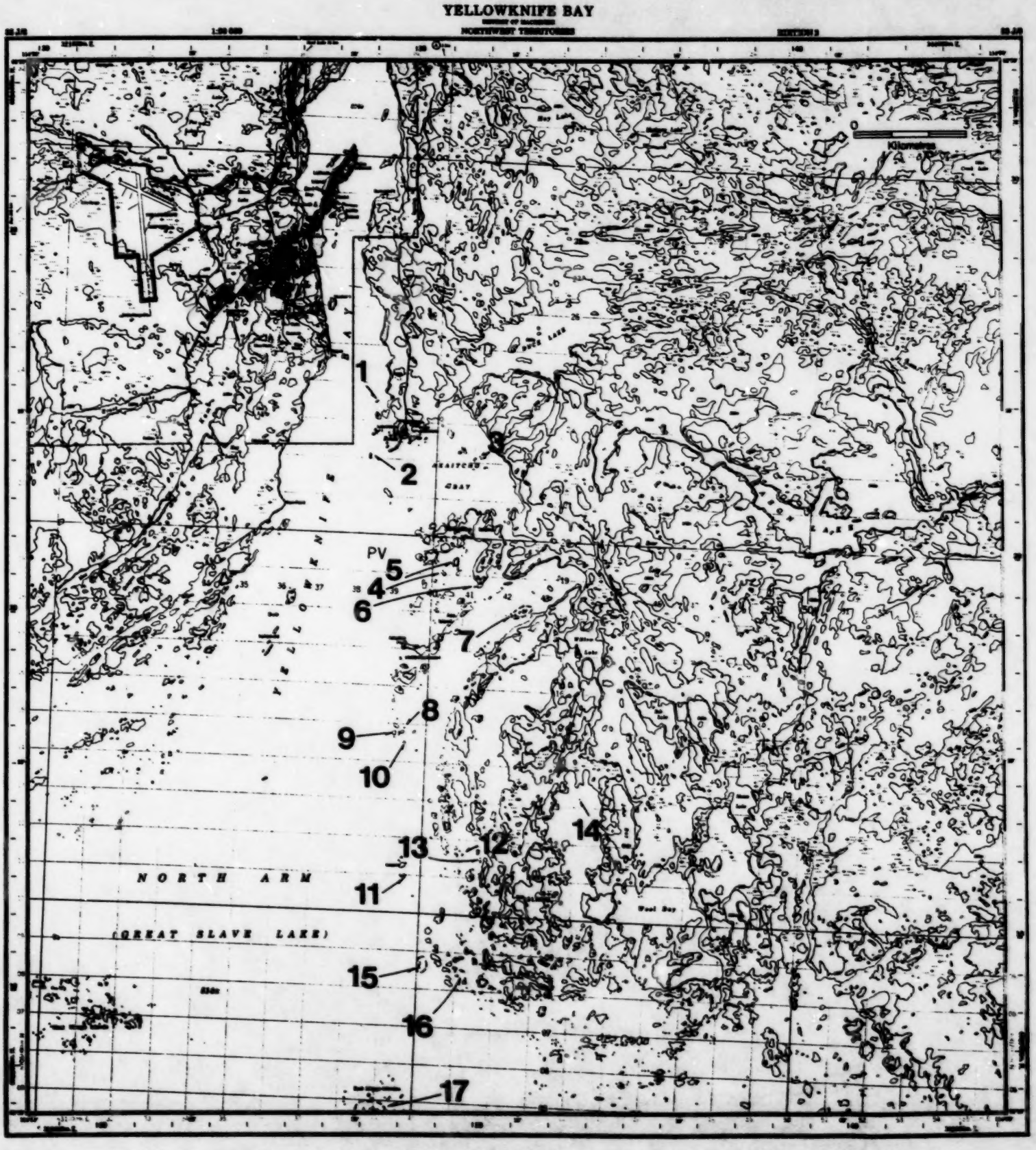
* Active pairs = incubating pairs. Empty nests or apparently predated nests were not included even if a pair was present.

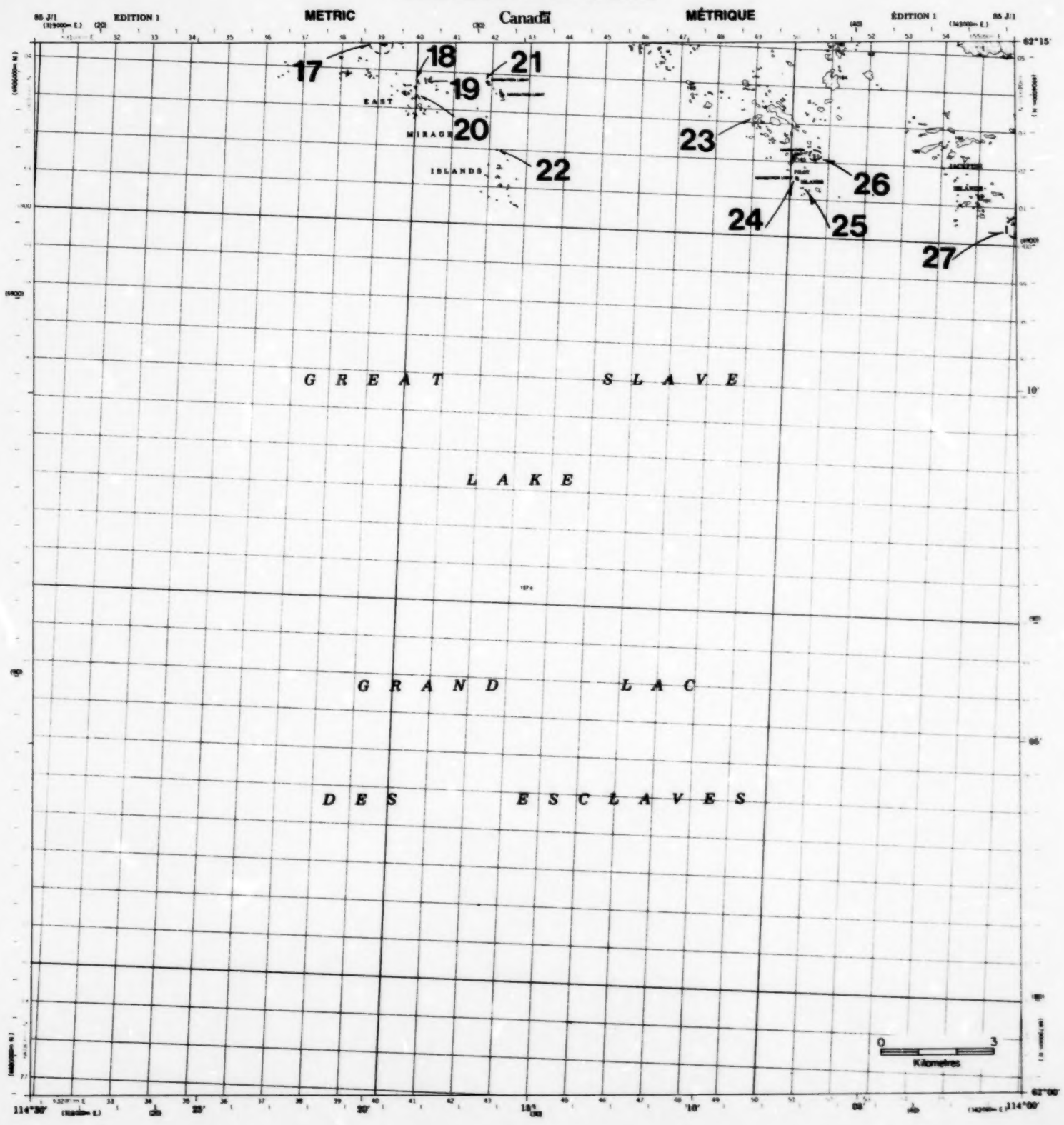
Appendix 3. Clutch sizes of breeding larids between Yellowknife and Gros Cap, June 1987.

Species	Number of Clutches	Number of Eggs		
		1	2	3
Caspian Tern	13	1	9	3
Arctic Tern	152	19	82	51
Common Tern	7	-	3	4
Herring Gull	245	35	116	94
California Gull	334	41	139	154
Mew Gull	41	11	13	17
Parasitic Jaeger	4	-	4	-

Appendix 4. Location of larid breeding sites between Yellowknife and Gros Cap, June 1987.

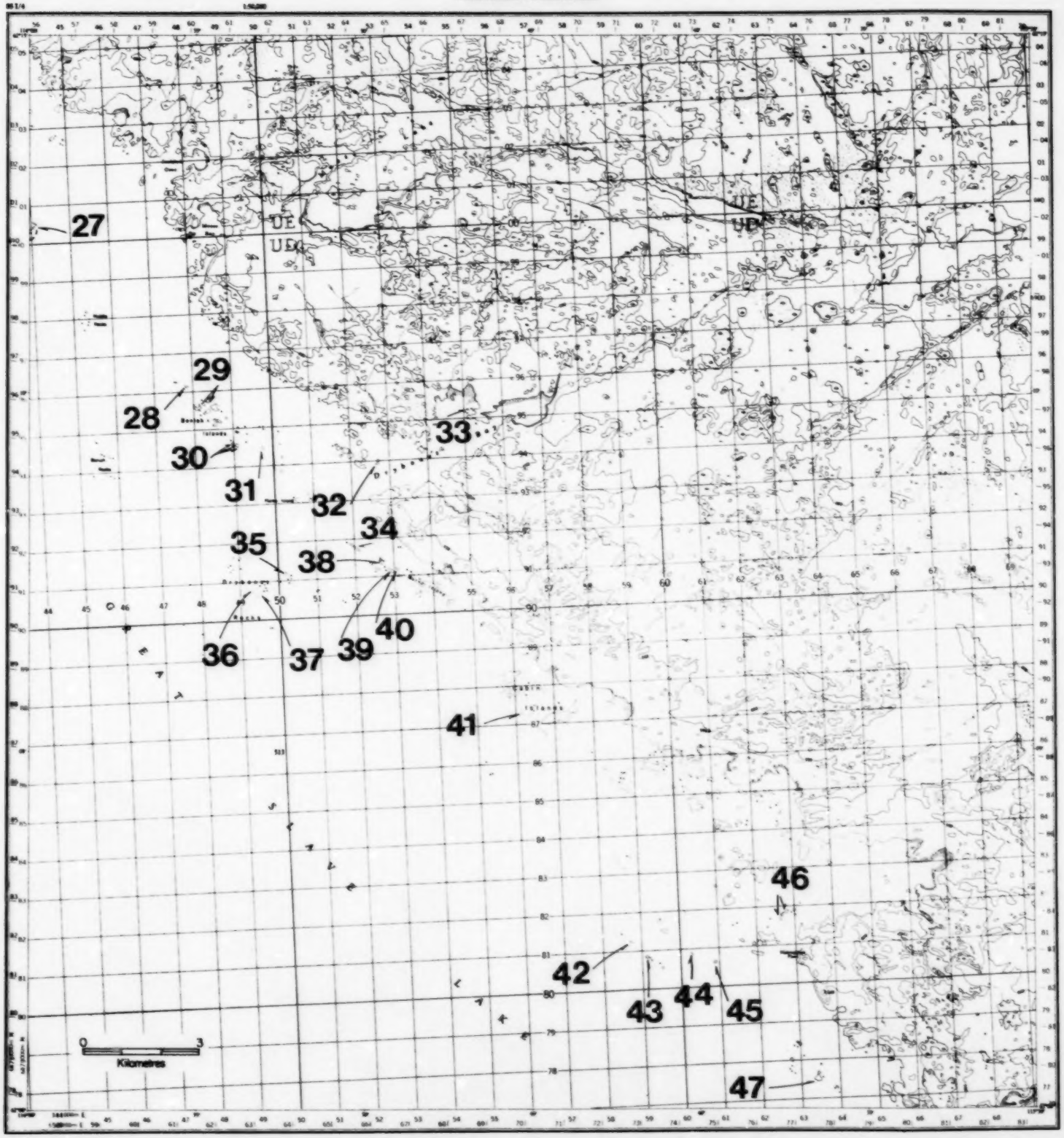
Five maps showing the location of Sites 1 to 49.


YELLOWKNIFE BAY
NORTHWEST TERRITORIES
Kilometres
PV
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
NORTH ARM
(GREAT SLAVE LAKE)


PILOT ISLANDS
DISTRICT OF MACKENZIE DISTRICT DE MACKENZIE
NORTHWEST TERRITORIES TERRITOIRES DU NORD-OUEST
85 J/1
EDITION 1
METRIC
Canada
MÉTRIQUE
ÉDITION 1
85 J/1
17
18
19
20
21
22
23
24
25
26
27
EAST
MIRAGE
ISLANDS
GREAT SLAVE LAKE
GRAND LAC DES ESCLAVES
0
3
Kilometres
62°15'
62°00'
114°30'
114°00'

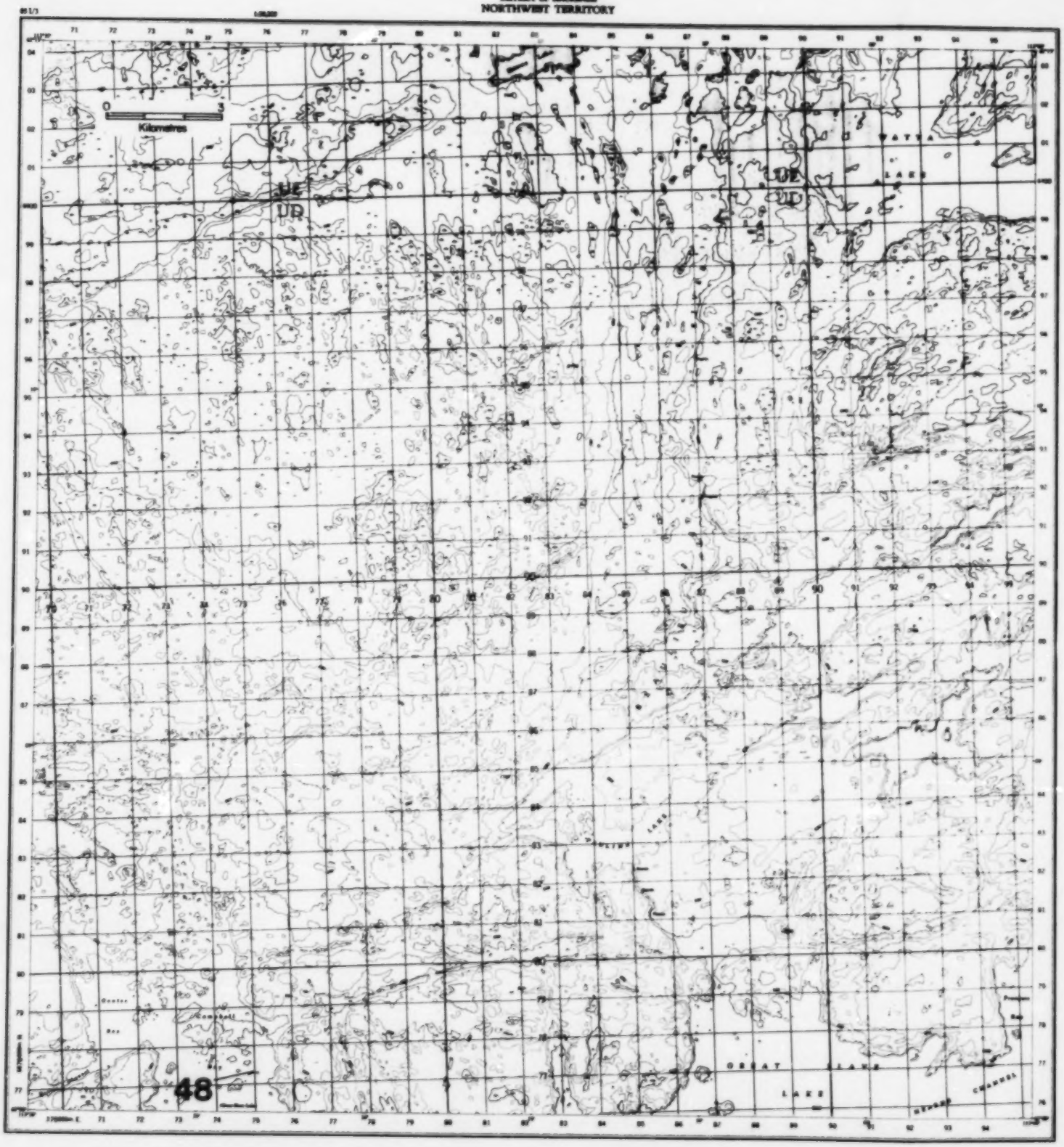
MATONABBEE POINT

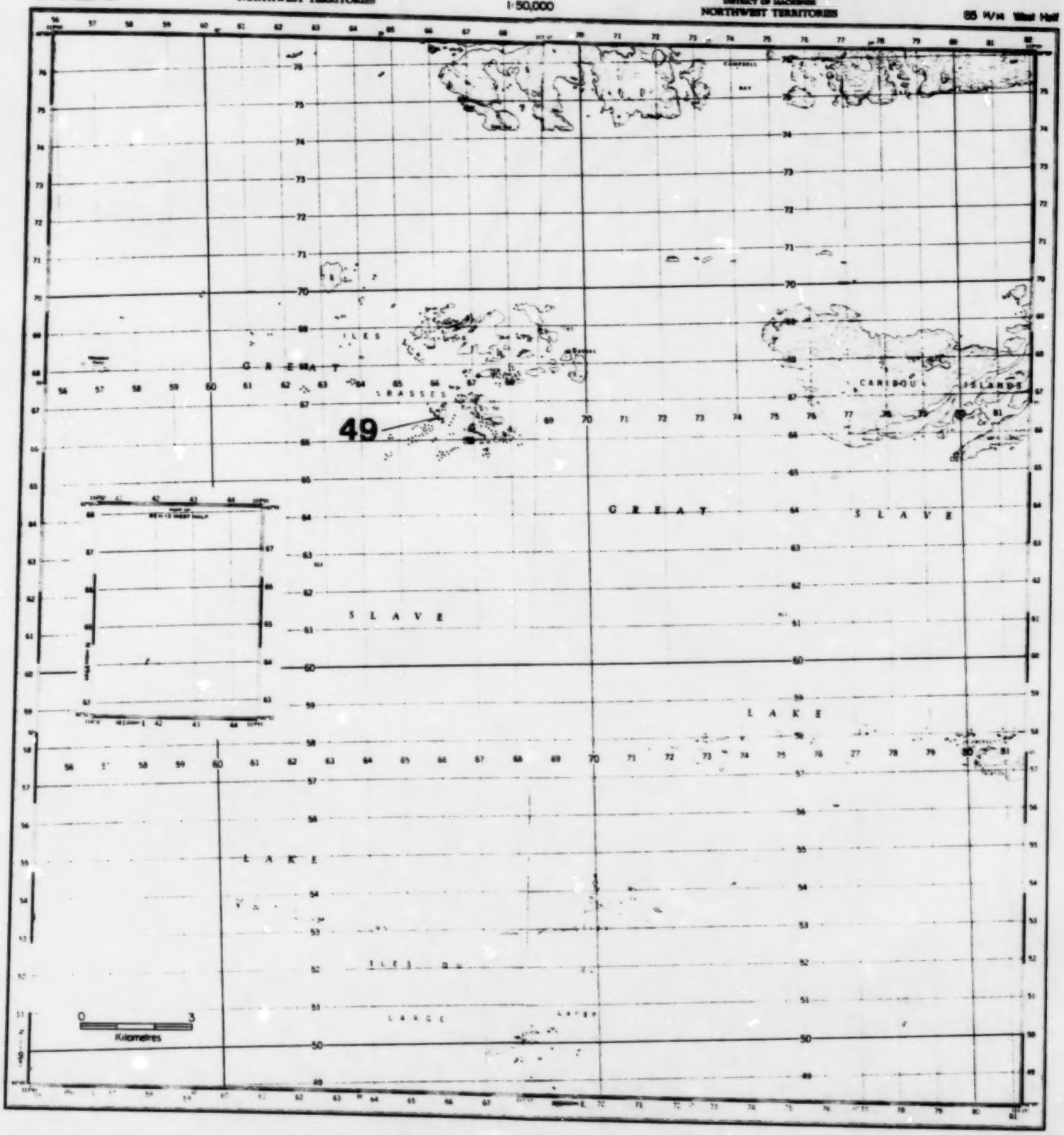
DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES



PAULINE LAKE

DISTRICT OF MACKENZIE
NORTHWEST TERRITORY




WHALEBACK ROCKS
DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES
1:50,000
CARIBOU ISLANDS
DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES
85 H/13 East Half
85 H/14 West Half
49
GREAT SLAVE LAKE
ILES BASSES
CARIBOU ISLANDS
0 3
Kilometres